



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,654	03/08/2001	Tranh To Nguyen	NPH-001	7519
53830	7590	11/30/2005	EXAMINER	
KOKKA INTELLECTUAL PROPERTY GROUP, PC 800 SAN ANTONIO ROAD SUITE 4 PALO ALTO, CA 94303			SHINGLETON, MICHAEL B	
			ART UNIT	PAPER NUMBER
			2817	

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/802,654

Applicant(s)

NGUYEN, TRANH TO

Examiner

Michael B. Shingleton

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION:

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09-12-2005

- 4) ☐ Interview Summary (PTO-914)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Michael B. Shingleton
MICHAEL B. SHINGLETON
PRIMARY EXAMINER
PTO ART/INTOR17

DETAILED ACTION

Due to the lack of proper antecedent basis in the specification at the time of the previous Office action and the fact that the claims have been amended to use terms like "isolated" that was not presented at the time of the previous Office action these issues has required that the reasoning in the rejections be reworded and the new issues addressed in the rejection below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grant 6,762,645 (Grant).

Figures 3-5 and 8 and the relevant text of Grant discloses a "high efficiency switching amplifier" that amplifies an audio signal. The "reference input signal" thus will be the audio signal described in Grant and in particular note Figure 3 of Grant. Note that Figure 5 of Grant shows a direct current supply (Note the + terminal and the 0V terminal.) that because of the switching action of the full bridge arrangement shown in Figures like Figure 5 the high efficiency switching amplifier" of Grant is for "digitally processing the electric power from the direct current supply". This is explained in further detail below. The transistor Q1 in combination with diode D1 and the transistor Q3 in combination with the diode D3 forms a "first switching power supply converter" as is meant by applicant. Here the Q1 in combination with diode D1 forms a bi-directional switch and transistor Q3 in combination with the diode D3 forms a bi-directional switch. The transistor Q2 in combination with diode D2 and the transistor Q4 in combination with the diode D4 forms a "second switching power supply converter" as is meant by applicant. Here the Q2 in combination with diode D2 forms a bi-directional switch and transistor Q4 in combination with the diode D4 forms a bi-directional switch. The positive terminal of the speaker is seen as the left-hand terminal of the speaker and the negative terminal of the speaker is seen as the right-hand terminal of the speaker in Figure 5 of Grant. As recited by column 5, around line 45 of Grant Q1 and Q4 are on at the same time and Q2 and Q3 are on at the same time. It is assumed that when Q1 is on then Q4 is on and a voltage is applied to the positive terminal of the speaker during the time when the audio signal is positive. (Note that Grant is silent on relating the "positive portion" of the audio signal to the time

when Q1 is on, however, for examining purposes it is assumed that such is the case as the only other possible condition would be that when the audio signal positive Q3 is on which would make the right-hand terminal of the speaker the positive terminal with respect to the claimed invention. Note that either interpretation of the Grant reference can be used to meet the claim limitations. The examiner has just chosen one so as to not unduly complicate the rejection.). The time when Q1 is on is proportional to the magnitude of the positive portion of the audio signal. This is how a pwm class D switching amplifier works. Thus because of the filtering action at the output of the bridge arrangement a voltage proportional to the reference input signal is generated. When the first switching power converter is active i.e. Q1 is on then the second power converter provides for a return path for the first switching power converter's current to and from the loudspeaker via the transistor Q4 and diode D4. The same basic analysis applies to the "negative portion" of the audio signal. It is assumed that when Q2 is on then Q3 is on and a voltage is applied to the negative terminal of the speaker during the time when the audio signal is negative. The time when Q2 is on is proportional to the magnitude of the negative portion of the audio signal. This is how a pwm class D switching amplifier works. It takes a direct current voltage and applies it in one direction to a load for a certain time and then reverses the voltage applied across the load for a certain time. Thus because of the filtering action at the output of the bridge arrangement and the time the transistor of a particular power converter is on a voltage proportional to the reference input signal is generated. When the second switching power converter is active i.e. Q2 is on then the first power converter provides for a return path for the second switching power converter's current to and from the loudspeaker via the transistor Q3 and diode D3. Grant does not call the first and second switching converters as defined above "isolated". Given the broadest reasonable interpretation of this term the first and second converters of Grant are seen as both being "isolated". However, alternatively it is well known to employ buffers sometimes referred to as drivers to isolate the switching elements of the converter from other circuitry in the arrangement. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided buffers or drivers to the inputs of the converters thereby making "isolated" converter so as to isolate the inputs of these transistor switching elements that make up the converters from the other circuitry of the arrangement as is conventionally known in the art to do so.

Note that the transistors like Q1 and Q2 of Grant are field-effect transistors, commonly referred to in the art as MOSFETs or "metal oxide-semiconductor field-effect transistors".

With respect to claim 23 here applicant recites that the first and second isolated switching power converters are selected from the group of converters comprising a buck converter, a forward converter, a push-pull converter, a half-bridge converter, an asymmetrical half-bridge converter and a full-bridge

converter. The original specification is silent on what type of converters the Figure 11 and 11B species contains, although it is assumed to be one of the converters listed in claim 23. The specification has been amended to point to what applicant considers the first isolated switching power converter and the second switching isolated power converter. Namely applicant believes that the first switching isolated power converter "includes transformer T1A and switches S1, S3, and Q5". This does not seem to fit any one type of converter as listed in claim 23. It appears to be a combination of a full bridge converter and a buck converter but it could also be considered a half-bridge arrangement. In other words the unconventional description of the first and second isolated power converters as disclosed by applicant does not seem to fit with the conventionally disclosed structures meant by a buck converter, a forward converter, a push-pull converter, a half-bridge converter, an asymmetrical half-bridge converter and a full-bridge converter. Applicant is request to point out in Figure 11 and Figure 11B what type of converter the first isolated power converter is in response to this office action. For examining purposes it is assumed the first and second isolated power converters will be assumed to be half-bridge converter arrangements. Accordingly, the Grant reference when one refers to the first converter as being composed of at least Q1 and Q3. This converter could be considered to be part of a half-bridge arrangement as is the second converter that is composed of at least Q2 and Q4.

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over King 6,388,514 (King) in view of Grant 6,762,645 (Grant).

Figures 2, 3 and 4 and the relevant text of King disclose a "high efficiency amplifier arrangement" that amplifies an audio signal. The "reference input signal" thus will be the audio signal described in King. Because of the diodes D1 and D2 a direct current power supply is formed. The first converter would be composed of transistor Q3 and the capacitor C2. The second converter would be composed of transistor Q2 and capacitor C3. A pwm controller controls these transistors as is clearly illustrated by King. King as noted in the previous Office action shows a conventional half bridge arrangement for the Figures 3 and 4 embodiments. However, King shows that a full bridge embodiment could be used as shown in Figure 2. King also points out at least on advantage to using a full bridge arrangement over a half bridge arrangement and that is a "DC block capacitor" is not required. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the half bridge arrangement with a full bridge arrangement so as to remove the DC blocking capacitor as taught by King. Thus the two upper transistors of the full bridge arrangement would now be the first converter and the two lower transistors would be the second converter. King is also silent on the

transistors being "bi-directional". Figures like Figure 5 of Grant shows the use of diodes D1-D4 placed in parallel across the switching transistors of a full bridge arrangement. Column 4, around line 53 states that these diodes inhibit "current shoot-through" thus these diodes enhances the switching operation of these MOSFETs. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide diodes connected across the transistors of the full bridge arrangement made obvious above involving King so as to inhibit "current shoot-through" and thus enhance the switching operation of these transistors as taught by Grant. Like in the above 35 USC rejection involving just Grant the full bridge arrangement of King in view of Grant made obvious above would provide for the functional language of claims 21-23. In particular note that when the first converter is active the power supply voltage will be connected to the left most other speaker and the rightmost transistor of the second converter would be on that provides a return path for the first converters current. Likewise when the second converter is active then the voltage across the speaker will be reversed and the rightmost transistor of the first converter will provide a return path of the second converters current. The pwm makes sure that the magnitude of these voltages applied to the speaker via the filter elements of the load is proportional to the positive and negative portions of the audio signal. Note that the audio signal must be AC as it has frequency. Given the broadest reasonable interpretation of the term "isolated" would be that the first and second converters of the combination of King and Grant are seen as both being "isolated". However, alternatively it is well known to employ buffers sometimes referred to a drivers to isolate the switching elements of the converter from other circuitry in the arrangement. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided buffers or drivers to the inputs of the converters thereby making "isolated" converter so as to isolate the inputs of these transistor switching elements that make up the converters from the other circuitry of the arrangement as is conventionally known in the art to do so.

Also note that the switching transistors of King are MOSFETs or metal oxide field effect transistors as shown in the Figures of King. As noted above with respect to the 35 USC 103 rejection involving just Grant, it is assumed that the first and second power converters of the Figure 11 and Figure 11B embodiments of the instant application are half bridge converters. Thus the first and second converters of King are likewise considered to be half-bridge converter arrangements.

King shows in addition to that above a transformer having two secondaries and a primary connected to a switch Q1. Clearly using applicant's convention the upper secondary would be part of the first converter and the lower secondary would be part of the second converter.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over King in view of Grant as applied to claims 21-23 above, and further in view of Bassett 4,959,764 (Bassett).

The combination of King and Grant fails to disclose the input switching arrangement that is connected to the primary of the transformer T1 as being composed of at least two transistors. A comparison of Figures 2 and 2A of Bassett shows that the use of two transistors connected to the primary of a transformer whose secondary is used in combination with diodes to form a direct current is an art recognized equivalent arrangement to the use of but a single transistor.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the single transistor Q1 connected to the primary of the transformer of King with one that employs two transistors given the art recognized equivalents of these two structures as taught by Bassett. It would be an obvious consequence that one of the two transistors formed at the input of the transformer would then be considered to be part of the first isolated power converter and the other transistor would then be considered to be part of the second power converter.

The terminal disclaimer 09-12-2005 has been approved.

Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

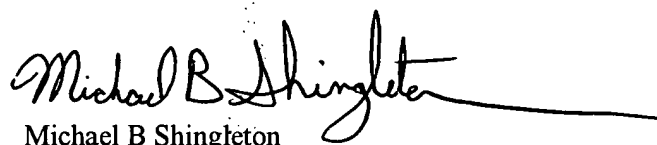
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306 and after July 15, 2005 the fax number will be 571-273-8300. Note that old fax number (703-872-9306) will be service until September 15, 2005.

Art Unit: 2817

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS

November 25, 2005

A handwritten signature in black ink, reading "Michael B. Shingleton". The signature is fluid and cursive, with a long horizontal line extending from the end of the name.

Michael B Shingleton
Primary Examiner
Group Art Unit 2817